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CASE REPORT

Operative treatment of medial clavicle fractures: An alternative surgical technique

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Introduction

Clavicle fractures are common, representing around 3% of all fractures. Fractures to the medial end of the clavicle however are uncommon, representing only 2–4% of all clavicle fractures.^{4,5} Typically treatment for this injury would be non-operative, but recent research has suggested that particularly with displaced fractures the possibility of fixation should be explored.³

The recent introduction of fixed angle locking devices has improved the treatment options for a number of fractures including mid-shaft and lateral clavicle fractures. We describe a technique of using a congruent lateral clavicle locking plate on the contralateral side to fix a displaced medial clavicle fracture.

Case history

We have used this technique in two cases with excellent results.

Case 1

25-year-old male student, previously fit and well: He sustained his injury following a fall from a pedal bicycle. He was reviewed in accident and emergency (A&E) who following plain radiography confirmed an isolated injury to the medial

clavicle and referred to fracture clinic where he was seen 2 days later.

A computed tomography (C.T.) scan was performed (Fig. 1) to evaluate the fracture more carefully and exclude a dislocation/subluxation of the sterno clavicular joint. Due to the significant displacement we felt surgery was indicated. Surgery was performed 9 days post-injury.

Case 2

41-year-old male nurse: Past medical history included Crohn's disease, for which he was currently taking methotrexate. He had not been on oral steroids for 2 years. He sustained this isolated injury following a fall off a motorcycle at approximately 40 mph.

Referred from A&E to fracture clinic where he was reviewed at 2 days. A C.T. scan was again performed confirming the diagnosis of a displaced medial clavicle fracture. Surgery was performed at 10 days post-injury.

Surgical technique

The patient is placed in the beach chair position. A direct approach over the medial part of the clavicle is used with a 5–6 cm skin incision. Dissection down to bone is carefully performed preserving the cutaneous nerves and protecting the posterior structures. Once the fracture is identified the fracture is reduced anatomically and held with reduction forceps. The fracture was suitable for an inter-fragmentary lag screw inserted in the standard fashion. A Mayo congruent clavicle locking plate (Acumed Ltd., Weyhill, and

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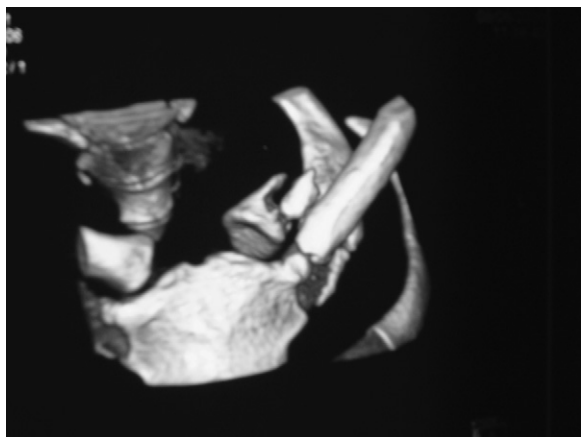


Figure 1 CT scan showing displaced left medial clavicle fracture.

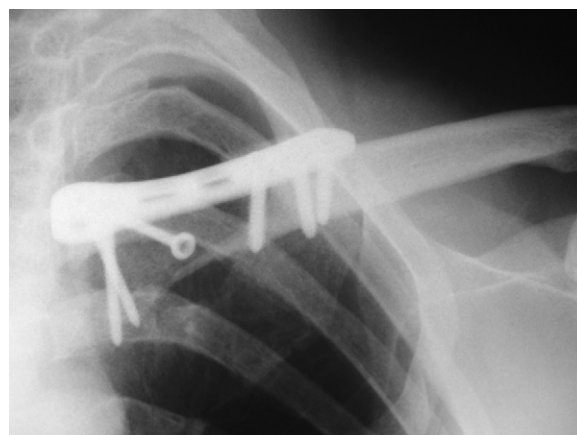


Figure 4 Post-operative X-ray.



Figure 2 Range of pre-contoured locking plates.

Andover, UK) (Figs. 2 and 3) intended for a contralateral lateral clavicle fracture fits the bony anatomy well and can then be used. An appropriate sized plate is chosen depending on the individual fracture pattern and contours of the



Figure 3 Left pre-contoured plate, used on the antero-superior aspect of clavicle.

clavicle. The plate is placed on the antero-superior aspect of the clavicle. Unicortical locking screws are used. A rigid fixation giving good stability to the fracture is achieved. The wound is closed in the usual fashion.

Post-operative management

This technique allows excellent fixation and therefore early mobilisation under physiotherapy guidance was commenced. Post-operatively both patients were managed for 4 weeks in a poly sling. Physiotherapy commenced at day 2 post-operation, included below shoulder height exercises for 6 weeks followed by full range of movement exercises.

Both patients went on to unite by 12 weeks post-operation (Fig. 4). Patients regained a full range of pain free movement in the shoulder and at 3 months post-surgery both patients had returned to their pre-operative level of function. There were no complications.

Discussion

The best treatment for these difficult and uncommon fractures is unknown. They are often associated with polytrauma and therefore have a high associated mortality.⁵ Due the proximity of important structures they have often been treated conservatively to avoid intra-operative complications. We describe a surgical technique using a currently available device that has not previously been reported in the literature.

The literature suggests displaced fractures of the mid and distal thirds of the clavicle treated conservatively have poorer outcomes with increased rates of non-union, longer time to radiographic union and symptomatic mal unions in patients treated conservatively.^{1,2} It is quite possible that medial clavicle fractures behave in a similar fashion.

Fracture/injury specific pre-contoured plates, such as the Acumed clavicle plate, are becoming increasingly available. They allow a good reduction to be maintained, theoretically improving the rates of union and allowing a return to good

function. The plates are low profile and reduce soft tissue irritation.

We have found that using a lateral clavicle congruent plate on the contralateral medial clavicle provides stable fixation of the fracture with the benefits this will bring. It reduces the risks associated with standard plate osteosynthesis of these fractures by allowing unicortical locking screws. In our hands this technique has achieved excellent results. We believe this to be a technique which is reproducible and easy to learn and provides a safe alternative means of treating a difficult fracture.

Conflict of interest

The authors have no conflict of interests in the preparation of this manuscript.

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